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ABSTRACT

This paper examines the issues underlying teacher supply and demand as they apply to Connecticut public schools. The first section, "Refining the Model for Estimating State-Level Public School Educator Demand," looks at: the demand model; enrollment projections; teacher attrition; unfilled positions; migration between assignment areas and districts; differences in the proportion of part-time to full-time educators in the newly hired and continuing educator pools across assignment areas; state-level hiring responsiveness to changes in elementary, middle, and high school enrollments; district and state policy initiatives; and the demand projections for educators through 2003. Section 2, "Estimating Educator Supply: Confronting an Imperfect Science," discusses: sources of Connecticut's new hires: 1993-98; 1998 newly hired educator's survey: what was learned about new hires' search for public school positions; first certificates awarded annually: Connecticut's new educator supply source; the depth of Connecticut's educator reserve pool; new flow into the reserve pool; and supply pool concerns. Section 3, "State Policy Interventions and District Hiring Practices to Mediate Educator Shortages," presents five recommendations for recruiting and retaining well-qualified educators for Connecticut public schools. (Contains 22 references.) (SM)

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Projecting State-level Teacher Supply and Demand: Improving an Imperfect Science to Enhance Policy Decision-making

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Projecting State-level Teacher Supply and Demand: Improving an Imperfect Science to Enhance Policy Decision-making

Introduction

Current national trends in public school enrollment and staffing projections for the next decade have once again rekindled the debate over whether or not the nation is facing a generalized public school educator shortage. The US Department of Education estimates that elementary, middle, and high school enrollments will increase to 54.6 million by 2006 (N.C.E.S., 1996a). These enrollment increases are occurring in tandem with national and state policy initiatives to raise entry standards for new educators (Archer, 1998) and to reduce class size to advance the goal of improving the performance of all children (Fetler, 1997a).

For more than a decade nationwide public school educator attrition has averaged about six percent, with retirements accounting for the largest portion of educators who leave public schools (Boe et al., 1999a). Over the course of the next decade a large portion of the cohort of baby-boomers who entered the teaching profession in the late 1960s and early 1970s, and account for approximately half of the current educator work force, will be eligible to retire (N.C.E.S., 1996b). In 1996, the National Commission on Teaching and America's Future estimated that the nation's schools will need more than two million new teachers by 2006. More recent projections suggest the number of newly hired teachers needed could be as great as 2.7 million by 2008 (Husser, 1999).

Several factors suggest that the supply pool of public school educators is likely to be more constricted in the future than it was in the past. These include an acute shortage of substitute teachers who traditionally have been drawn from state-level 'reserve pools' and often used such positions as a transition back into full-time employment, increased reports of out-of-field teaching assignments and uncertified applicants filling positions particularly in large urban districts serving predominately poor children and the underproduction of new teacher preparation program graduates with majors in secondary education disciplines and special education(Boe et al., 1999b; Shen, 1997; Ingersoll & Gruder, 1996; N.C.E.S.,

1996c; Beaudin, 1995, 1993). In addition, the solid economic climate with historically low unemployment rates creates a wide range of employment options outside of education, particularly for individuals trained in the sciences and technology.

The coupling of these factors suggests that the demand for new teachers with specific certification credentials will increase over the next decade while the supply may not. Policy analysts and educational researchers question whether the nation's public school districts will be able to attract the new teachers that they will need and many states have begun to scramble to offset shortfalls by instituting new programs such as alternate certification programs (Shen, 1997; N.C.E.S., 1996b; Stoddart & Floden, 1995; Feistritzer, 1993). A general teacher shortage, or shortage of teachers in specific assignment areas, is likely to thwart future state and federal efforts to improve the quality of public school education. In particular, the problem is likely to be exacerbated for school districts that serve large proportions of poor students which historically have had high teacher turnover rates (N.C.E.S., 1997; Fetler, 1997b; Beaudin, 1998).

National projections often camouflage differences among states and communities within states. This report examines the issues underlying educator demand and supply as they apply specifically to Connecticut public schools.

Refining the Model for Estimating State-level Public School Educator Demand

The annual demand for public school educators in Connecticut is the total number of educators districts must employ to fully staff administrative, professional support, and classroom positions to serve all of the children who attend the state's public schools. To estimate the future annual demand for public school teachers, professional support staff, and administrators, the Connecticut State Department of Education (CSDE) developed an educator demand model using cohort survival analysis. The model, which was initially developed in 1983 to study Connecticut public school educator demand (Prowda and Grissmer, 1986; CSDE, 1985) and expanded in 1988 for a follow-up study (Beaudin and Prowda, 1990), was again updated in 1999 to estimate the future demand for educators in 18 assignments[1]. It uses a variety of data sources[2], taking into account the following factors:

1. annual projected changes in enrollment at the elementary, middle, and high school levels,
2. age-specific retention rates for continuing educators (based on the average of the attrition rates for 1996-98) for each assignment group,
3. the age distribution for the annual pool of new hires (based on the 1998 age distribution of new hires) for each assignment group,
4. the number of unfilled positions within each assignment area for the fall of the 1998-9 school year that were reported in the Annual Fall Hiring Report,
5. annual projected net migration of continuing educators across assignment areas based on 1996-8 migration,
6. annual projection of the net proportion of continuing educators within each assignment area who move from part to full-time positions,
7. district hiring response to enrollment changes at the three school levels,
8. statewide policy initiatives requiring additional teachers, and
9. the estimated increase in retirements due to the July 1, 1999 changes in the Connecticut Teacher Retirement Board (TRB) age/experience early retirement factors.

The Demand Model

The model for projecting the total number of newly hired educators that Connecticut public schools will need to hire for each of 18 assignment groups in future years can be specified algebraically :

$$N_{y,} = [T_y - C_{y,}] * FP + M$$

The number of additional newly hired educators (N_y) who will be needed to fill positions in each of the 18 assignment groups during a given school year, y, is equal to the difference between the projected total demand for educators T_y during a given year (y) in the assignment group and the number of educators in the assignment group who continue C_y from the previous year to the given year, y, to work in that assignment in the state's public schools. New educators are those who must be hired to replace educators who have left and to fill newly created positions to respond to enrollment changes or policy initiatives (e.g. reducing K-3 class sizes, changing graduation requirements). The estimated number of newly hired educators is adjusted to account for two additional factors. The first is the difference in the proportion of part-time educators to full-time educators (FP) in the newly hired and continuing pools for the assignment group.[3] The second is thethe net number of migrant continuing educators (M) who annually transfer into or out of the assignment area, based on the previous three year average (this could be a positive value if the assignment is a net exporter or negative value if it is a net importer). The total number of new educators that the state's public schools will be expected to need annually is the sum across the 18 assignment groups.

The total number of educators T_y needed in a specific assignment area during a given year (y) is a function of four components:

1. projected changes in pupil enrollments (ΔP) at the elementary (1), middle (2), and high school (3) levels during each year,
2. the state-wide hiring ratio, R, for each level, that reflects district-level hiring responsiveness to enrollment changes, [4]
3. the number of unfilled positions in the assignment group (U) from 1998 that still needed to be filled at the beginning of the 1999 school year, and

4. the number of additional educators required because of new state or federal policy initiatives (PI) that currently have funding dedicated for future years.

T_y can be described algebraically: $T_y = \sum_{level=1}^{3} T_{y-1}*(1 + \Delta P*R) + U + PI$.

The number of continuing educators (C_y) in each assignment group is a function of the total number of educators during the previous year ($T_{(y-1, a)}$) at each age (a) from 21 to 72, and the age-specific retention rate (r_a) for the assignment group, based upon the previous three year average. The age-specific retention rates for educators from age 50 to 59 were adjusted downward by two percentage points o account for the estimated increase in the number of retirements for those educators with at least 30 years of experience who are expected to retire early in response to increases in the TRB's retirement pension rates. Since there are small numbers of educators ages 65 to 72 in each assignment group, the retention rates were systematically adjusted to retire everyone by age 72.

C_y can be described algebraically: $C_y = \left(\sum_{a=21}^{72} T_{(y-1, a)} * r_a \right.$

All components of the model are discussed below.

Demand models have been estimated for 18 assignment area subgroups for two reasons. First, the age distributions of continuing educators and age-specific retention rates differ across assignment areas. Second, enrollment changes will differ for elementary, middle, and high schools over the next decade and, as a result, districts will need to hire teachers who meet the certification requirements of the specific assignments they will hold. Annual retention and enrollment data are used to project the number of educators who will continue from one year to the next and the total number of educators needed annually to meet changes in demand. The projections are then used to calculate the number of new positions districts will need to fill, taking into account part-time hiring patterns in each assignment area and inter-assignment migration.

Enrollment Projections

Table 1 contains actual enrollment figures for the elementary (K - 5), middle (6 - 8), and high school (9 - 12) students enrolled in Connecticut public schools in 1998 and projections for 1999 to 2003. Over the five year period public school enrollments will increase from their current level of 545,663 to peak in 2001 at 557,770, an increase of about 12,100 students, and then decline to 556,050 in 2003.

Year	Elementary	Middle	High	Total*
1998	263,461	122,984	144,832	545,663
1999	262,000	125,650	149,460	551,440
2000	258,330	128,280	153,660	555,280
2001	254,150	130,900	157,400	557,770
2002	249,520	131,570	160,710	557,620
2003	245,690	129,970	164,200	556,050

Table 1: Connecticut Public School Enrollment Projections 1998-2003
*Ungraded student enrollment included in the total

The direction of the enrollment changes in Connecticut will not be consistent across school levels over the next five years. The school level changes break out in the following manner:

- Grades K-5 will decrease from their current high of 263,461 to 245,600 in 2003, a decrease of about 17,860,
- 6-8 will peak in 2002 at 131,570 reflecting an increase of about 8590 and then begin to decline,
- 9-12 will continue to increase through 2003 with a total enrollment of 164,200 students, reflecting an increase of approximately 19,370 students in 2003 over the 1998 level.

Since these projections are aggregated to the state level, they cannot accurately depict changes that may take place within individual districts; they only reflect state-wide trends. For example, although K-6 statewide enrollments are projected

to decrease over the next decade, some districts will experience increases in elementary school enrollment because of housing development opportunities in their communities.

If the state's districts maintain their 1996-97 ratios of 68.1 teachers, 5.2 support staff, and 6.8 administrators per 1000 students, then the change in enrollments by 2003 would require the net equivalent of about 700 additional full-time teachers, 55 additional full-time support staff, and 70 additional full-time administrators. If districts reduce class size or increase the ratio of support staff per 1000 students, then these projections would underestimate the actual need. The school level breakout for classroom teachers would be approximately:

- 1210 fewer K-5 teachers (retirements would reduce the need to eliminate some of these positions as would increases in all-day kindergarten and policy initiatives to improve reading in the early grades and reduce class size in grades 1-3),
- 585 additional 6-8 teachers,
- 1320 additional 9-12 teachers.

Since public school certification is assignment specific, a total of 700 is an underestimate of the number of additional teachers that districts will need to hire to accommodate enrollment changes. It is likely that the total additional demand would be closer to 2000 teachers, most of whom would require subject area certification for middle or high school assignments. Many K-5 teachers are generalists whose certification would allow them to teach in subject-specific disciplines in grades 6-8 but, unless they hold the appropriate dual certification, they would not be able to fill 9-12 positions.

Educator Attrition

Between the fall of 1997 and the fall of 1998, 2466 professionals left Connecticut public schools. The turnover rate for professional staff has increased to 5.5 percent, up from about five percent during the mid-1990s. Since 1990, an average of 1100 educators retired annually. As of July 1, 1999, the Teacher Retirement Board's (TRB) proration factor for teachers' pensions will reduce the penalty for educators with between 30 and 35 years of experience who would like to retire early. This may serve as an incentive for a greater

number of educators age 50 to 59 to retire early. The TRB projects the annual number of retirees will average about 1500 in the near future.

Table 2 identifies the 1998 total public school educator attrition rate and attrition rates for each of the eighteen assignment areas. It also includes the proportion of pre-retirement educators currently working in the state's public schools who are age 56 or older, and the proportion who are 51 years old or older. Many educators in these two age groups will be eligible to retire in the next five to ten years. Connecticut's total educator attrition rate in 1998 was 5.5 percent, which is lower than the national rate of six percent (Boe, et al., 1999).

Assignment	Attrition Rate	Percent At least age 56	Percent At least age 51
Elementary	5.1	14.9	37.2
Kindergarten	4.7	12.7	30.3
Reading	4.9	23.3	54.3
Special Education	4.7	7.7	21.0
Bilingual	5.7	15.3	33.1
English	6.4	18.0	43.3
World Language	6.4	14.0	41.0
Mathematics	5.3	16.7	44.7
Physical Sciences	5.5	19.2	45.9
Life Sciences	5.2	15.7	37.9
Social Studies	5.3	19.8	45.9
The Arts	5.6	12.3	30.6
Health, P.E	4.7	10.3	30.2
Applied Education	6.6	18.4	44.3
Other Teacher	5.0	18.9	44.4
Pupil Support Services	6.0	20.4	43.0
Librarian/Media	5.7	22.8	50.9
Administrator	7.1	27.2	61.4
Total	5.5	15.8	38.5

Table 2: 1998 Attrition Rate and Pre-retirement Age Distribution of Connecticut's Current Professional Staff, by Assignment Group

Attrition rates between fall 1997 and 1998 varied across assignment areas with the highest among administrators (7.1%) and pupil support services staff (6.0%) who tend to be older, on average, than classroom teachers. Among teachers, applied education teachers (6.6%) such as those who teach technology and business education, English (6.4%) and world languages (6.4%) had the

highest rates and kindergarten (4.7%), special education (4.7%), and health/PE (4.7%) had the lowest rates.

During the fall of 1998, the state's public schools employed 46,566 full and part-time professionals. Of these, 15.8 percent were at least age 56, and 22.7 percent were 51 to 55 years old. The proportion of the state's public school full-time professionals who were at least 51 years old has increased from 23.4 percent in 1992 to 38.5 percent in 1998. approximately by 2.5 percentage points per year.

Unfilled Positions

Connecticut public school districts advertised 4333 vacancies for professional public school positions, 3753 full-time and 580 part-time openings, for the 1998-99 school year. As of October 1, districts reported that 415 positions, 327 full-time and 88 part-time, were left unfilled at the beginning of the 1998-99 school year, accounting for about ten percent of the fall vacancies. These included 46 positions for which districts had no applicants and 274 for which they could not find acceptable applicants. The largest number of unfilled positions occurred in speech/hearing, special education, world languages, library/media, and the arts. Part-time positions and those requiring dual certification were particularly difficult to fill.

Migration Between Assignment Areas and Districts

Increasing demand for public school educators creates opportunities for continuing educators to move to more attractive assignments. The annual demand for new educators traditionally has not accounted for the continuing educators in the state who change assignments during consecutive years. Between the fall of 1997 and the fall of 1998, 971 continuing educators moved to a different assignment, 754 in the same district where they worked the previous year and 217 in a different district. In recent years, elementary education, special education, speech, and remedial/bilingual education have been net exporters of continuing educators to other assignment areas, while administration, professional support staff (counselor, school psychologists, social worker, librarian/media specialist, and reading consultant), and secondary school level academic subject areas have been net importers. As a result, the projected number of new positions that need to be filled for net exporting assignment areas

also needs to include replacements for continuing staff who migrate to different assignments. On the other hand, the projected number of new positions for net importing assignment areas need to be reduced to account for those continuing staff who are drawn from other assignments.

Historically, state level projections did not account for continuing educators who annually migrate between school districts in the state. In recent years about 20 percent of the new educators that districts hired were continuing educators who had worked in another Connecticut public school the previous year. Between 1997 and 1998, 920 continuing educators moved to different districts. About three-fourths moved to the same assignment in their new district as they held in their previous district. Annually, migrants from other Connecticut public school districts have accounted for about half of the new administrators and one-fourth of the new support staff that the state's districts hire.

If large proportions of experienced continuing educators migrate from the state's disadvantaged districts to more affluent districts, the state's poorer districts may be required to incur a disproportionate portion of the cost for attracting and hiring educators to fill new positions in the state. In addition, they would also have to shoulder much of the responsibility for inducting and developing inexperienced teachers.

Differences in the Proportion of Part-time to Full-time Educators in the Newly Hired and Continuing Educator Pools Across Assignment Areas

The projection of total demand for educators is based on the assumption that the annual future total demand for educational positions in the state will continue to have the same ratio of part-time to total positions (4.75%) as the total 1998 educator pool had. Historically, the proportion of part-time educators has been greater in the newly hired pool (15%) than in the continuing pool (5%). This translate into an increase in the number of newly hired educators needed to the fill full-time equivalent demand in those assignment areas where relatively large numbers of part-time positions need to be filled since a very small proportion of the state's educators hold multiple part-time positions that equate to a single full-time positions The proportion varies of part-time positions in the newly hired pool and continuing pool of educators varies across assignment areas. For

example, only about one percent of the state's elementary classroom and administrative positions were part-time in 1998 compared with more than 12 percent of the total art and music positions. For art and music 9.9 percent of the continuing positions were part time, compared with 38 percent of the part-time positions.

State-level Hiring Responsiveness to Changes in Elementary, Middle, and High School Enrollments

When educator demand data is aggregated to the state level, simple educator/student ratios do not capture the complexity of the relationship as it is operationalized at the district level. When enrollments decline/increase, measured at the state level, districts do not respond by eliminating/adding the equivalent of one teacher for the equivalent of a one class decline/increase in students, because the change in the number of students is distributed across schools and districts within the state. In the short term, teacher/student ratios increase or decrease marginally to absorb the change. In the late 1980s when Connecticut's public school enrollments were declining, district administrators responded to the decline by reducing the size of the professional staff by only half of the proportional decline in students. On average, one teaching position would be eliminated when the student enrollment in the state's districts declined by the equivalent of two classes of students. As enrollments began to increase in the early 1990s, districts hired additional teachers, but the proportion of new educator hires was less than the equivalent class increase in student enrollment. Districts have been more responsive in hiring new educators during periods of increasing enrollment than they have been in eliminating educators during periods of declining enrollment. State-level responsiveness rates, which were calculated by comparing the annual change in the number of educators in each assignment area to the change in the number of students, by school level, for 1996-8, vary substantially across assignment areas. Currently, Connecticut school districts are more responsive to changes in middle and secondary school enrollments in hiring classroom teachers than they are in hiring elementary teachers, and are virtually non-responsive to hiring administrators and pupil support services staff.

District and State Policy Initiatives

In addition to teacher attrition, other factors affect the annual demand for educators in specific assignment areas and may be interrelated with the rate at which districts collectively respond to enrollment changes at each school level. Some factors are the result of curricular decisions that districts make. Instituting additional pre-kindergarten, all-day kindergarten, enhanced reading programs, and elementary world language programs, or reducing class size would increase the demand for pre-K, kindergarten, and elementary teachers.

Others factors affect demand at the middle and high school levels. Changes in Connecticut public school districts' graduation requirements, instituting a middle and high school curriculum in computer technology, offering a wider range of advanced placement courses (such as world languages, the sciences, mathematics, and computer science), and expanding the mathematics and computer curriculum for non-college bound students all are likely to add to the demand for additional teachers to staff the state's middle and high schools. An increased interest among high school graduates in pursuing undergraduate majors in the health-sciences and science related careers, or international business, is likely to trickle down to affect high school students decisions to enroll in more than the minimum number of science, mathematics, business, and language courses needed to fulfill graduation requirements.

The Demand Projections for Educators Through 2003

Table 3 provides an estimate of the number of continuing educators that Connecticut public school districts will need to employ annually over the next five years to respond to changing enrollment, educator attrition, and policy needs, and the annual number of new positions that districts will need to fill with educators who are not currently employed in the state's public schools. The 'Total Position' column projects that the state's public school staff will gradually increase from 46,566 to 48,741 between 1998 and 2003, for a net increase of 2175 (4.7%) staff members.

Year	Total Positions	New Positions
1998	46,566	3891*
1999	47,627	4463**
2000	48,111	4079
2001	48,455	3982
2002	48,619	3913
2003	48,741	4007

* The 1998 count includes only new educators hired to fill positions.
** The 1999 count reflects estimates of the number of positions that need to be filled by new hires and migrants from other disciplines, including those unfilled in 1998

Table 3: Projected Total Educator Positions and New Positions for 1998-2003

Appendix 1 breaks out the projected total number of educational positions needed annually over the next five years by eighteen assignment areas. The number of teachers needed in each teaching assignment area increases gradually over the course of the six year period, with many of the required secondary subject areas reflecting a net increase of about two hundred teachers. Although the net increase in elementary and special education teachers is not as great, public school districts in Connecticut will continue to employ relatively large numbers of elementary and special education teachers. The number of administrator, support staff, and library media personnel remain fairly constant. during the six year period.

Appendix 2 provides projections for the annual number of new full and part-time positions that districts will need to fill. For the next five year the state will need to produce/attract an average of approximately 4087 new educators annually to fill vacant positions for a total of about 24,335 educators. In 1998, part-time positions accounted for about 15 percent of the annual positions that new hires filled, and the proportion of part-time positions varied across assignment areas. More 20 percent of the new positions in art, music, health/P.E., kindergarten, world languages, kindergarten, and bilingual education were part-time. If districts increase part-time hiring, the projections will underestimate the actual number of professional staff needed to fill positions in the future.

Estimating Educator Supply: Confronting an Imperfect Science

Estimating the future supply of new teachers, support staff, and administrators is a complex task since new educators are drawn from a variety of sources. Connecticut has two primary supply sources: 1.) individuals who were first certified during the previous year, for the most part new college graduates, and 2.) the 'reserve pool' of individuals who were certified in the past but who are not currently employed as public school educators. The 'reserve pool' includes experienced former Connecticut public school educators who interrupted their careers for a period of time and may be available to return to the state's public schools, educators who have educational experience outside of Connecticut public schools, and educators with no prior professional experience who were certified prior to the previous year.

Sources of Connecticut's New Hires: 1993 - 1998

Table 4 provides information about the number of new educators that Connecticut public schools hired from fall 1993 to fall 1998 and the supply sources from which they were drawn. In the late 1990s, the state's public school districts hired an average of 3600 new and returning (former Connecticut public school educators who return after a career interruption) professionals compared with about 2700 annually in the mid-1990s -- an increase of approximately one-third in the number of new hires. Over the six year period a total of 18,726 new and returning educators were hired.

Sources of new hires have changed dramatically in the late 1990s. Prior to 1995 returning experienced Connecticut public school educators who interrupted their careers and returned to the state's public schools accounted for about 50 to 55 percent of the annual pool of new hires. Since 1996 the proportion declined to 25 percent. Of the 1998 new hires with no prior formal Connecticut public school experience, 44.3 percent were certified within the previous year and 31.0 percent were drawn from the 'reserve pool' of individuals who were certified prior to the previous year.

Sources	1993	1994	1995	1996	1997	1998
Returning CT Educator	1169 53.0%	1687 54.7%	895 33.3%	912 25.3%	822 24.4%	921 24.7%
Certified Previous Yr.	537 24.3%	810 25.8%	1089 40.5%	1300 36.1%	1449 43.1%	1654 44.3%
Certified Prior	494 22.4%	644 20.5%	703 26.2%	1388 38.6%	1094 32.5%	1158 31.0%
Total	2200	3141	2687	3600	3365	3733

Table 4: Sources of Annual New Hires

Table 5 examines the same hiring data, disaggregated by the type of prior experience in education that newly hired educators had (Connecticut public school, other teaching experience, no teaching experience).

Sources	1993	1994	1995	1996	1997	1998
Returning CT Educator	1169 53.0%	1687 54.7%	895 33.3%	912 25.3%	822 24.4%	921 24.7%
Other Prior Experience	376 17.0%	541 17.2%	431 16.0%	983 27.3%	719 21.4%	818 21.9%
No Prior Experience	663 30.0%	913 29.1%	1361 50.7%	1705 47.4%	1764 52.4%	1994 53.4%
Total	2200	3141	2687	3600	3365	3733

Table 5: Prior Professional Education Experience of Newly Hired Educators

In 1998, 46.6 percent of the new hires had some formal professional experience compared with compared with 70 percent five years earlier. Prior to 1995, hiring practices suggest districts had a strong preference for experienced educators to fill classroom, support staff, and administrative positions, particularly those who had previously worked in a public school in this state. Beginning in 1995, the proportion of new hires with no prior experience increased markedly as the proportion of new hires with prior experience declined, suggesting that either fewer former Connecticut public school educators were available to return to public school positions in the state or that district administrators preferred to hire newly trained, inexperienced educators.

1998 Newly Hired Educator's Survey: What We Learned About New Hires' Search for Public School Positions

Appendix 3 contains a copy of the survey the Connecticut State Department of Education conducted of the state's fall 1998 newly hired educators. The survey responses provided information about the factors that contribute to prospective educators decisions to apply for and accept public school positions. Nearly two-thirds of the new hires found a position during the first year they searched. Twenty percent had searched for two years, eight percent for three years, and four percent each for four and five years. About half of the new hires learned about the availability of their current position by substituting or student teaching in their current district, or through a colleague or friend. Another 30 percent found vacancy information in newspaper advertisements or placement service publications while nearly three percent attended district recruitment activities such as college presentations or fairs. Fifteen percent contacted the district directly to search for positions.

Many of the newly hired educators were very selective in their search for positions. The median number of applications they submitted was five. Approximately 30 percent applied to only one district, compared to about 17 percent of the new hires in the early 1990s. Fifty percent applied to four or fewer districts, 75 percent to 10 or fewer, while only 10 percent applied to more than 20 districts.

The largest proportion of the new hires continued to show a preference for positions in suburban districts. About three-fourth submitted applications to suburban districts, 60 percent to small cities, 45 percent to rural districts, and 40 percent to urban districts. The most influential factors in new hires decision to accept their current position were the school's location, the type of assignment, and the community's reputation.

Most of this year's new hires were involved in activities directly related to education during the previous year. Twenty-nine percent were students, 28 percent were substitutes or tutors, 25 percent taught in a Connecticut non-public school or out of state, nine percent were employed outside of education and nine percent were homemakers or on a leave of absence.

The survey results suggest that in Connecticut, the educator supply pool is not uniform throughout the state. Most of the new hires restricted their applications for public school positions to specific types of districts within a limited geographic radius of their homes. They were more likely to apply to suburban and small city districts than to urban and rural districts.

First Certificates Awarded Annually: Connecticut's New Educator Supply Source

Appendix 4 summarizes the number of first certificates awarded annually between 1990-91 and 1997-98, by assignment area, and the number of individuals who received their first endorsement. Over the last eight years Connecticut issued an average of about 4420 first certificates to an average of 3160 prospective educators annually, approximately 1.4 endorsements per individual. In 1997-8, the state issued a total of 4820 first endorsements to 3745 individuals, reflecting about a 12 percent increase over the previous year. Elementary education certificates accounted for about 40 percent of the first endorsements to nearly half of the first endorsed individuals during the year, while special education and administrator certificates accounted for about 9.5 percent each. The number of first certificates awarded in reading, mathematics, and applied education (business, technology education, and consumer home economics) declined from the previous year. Of the newly endorsed, 54.3% percent of the 1997-98 first certified secured a professional position in Connecticut public schools at the

beginning of the 1998-99 school year, compared with 17.5 percent of the 1991-92 first certified who secured positions within the next year.

The ratio of number of individuals who were issued first endorsements during the 1992-93 school year to the number of newly hired educator positions filled during the 1993-4 school year was 1.3. In 1992-3, the state issued new certificates to four individuals for each three positions that needed to be filled the following school year. If districts only hired newly certified individuals to fill all available positions, about one in four of the first certified individuals would not have found a public school position and would have entered the state's 'reserve pool.' By the 1998-9 school year, the ratio of the previous year's first endorsements to new positions filled declined to 0.90; the state was only endorsing nine individuals for each position that needed to be filled. This suggests that fewer individuals would be available to flow into the reserve pool than in the past to draw upon to staff public schools in the future.

The ratio of endorsements to new hires varies markedly across assignment areas. The ratio of elementary endorsements to the number of new hires has been consistently high. Annually, at least three educators have been endorsed for every two positions that need to be filled. In contrast, for assignment areas such as mathematics, reading, bilingual education, and the physical sciences, the state is issuing only three first endorsements for every four positions needing to be filled.

How Deep is Connecticut's Educator Reserve Pool?

This year's 'reserve pool' consists of educators who were certified more than a year ago who are not currently employed in a professional position in the state's public schools. It includes former educators who left Connecticut public school positions in the past and may be available to return in the future, and individuals who were certified in previous years but have never held professional public school positions in Connecticut.

Several factors suggest that the state's pool of former teachers who are available to return to the classroom is dwindling. First, the hiring trends noted earlier shows that Connecticut public school districts historically have exhibited a preference for hiring new teachers who had some teaching experience rather than those who have none; this has changed markedly in the last three years. Second,

district administrators report a shortage in the number of individuals available to substitute in their schools, a path that many returning educators have taken to make a transition to the classroom. Third, a relatively large portion of the individuals who have recently left the state's public schools or who will leave over the next decade will retire and, as a result, will be less likely to return than younger leavers.

Historically, the 'former Connecticut educator' subpool of the reserve pool has contributed a substantial number of newly hired educators to the state's annual public school work force. The depth of the former educator subpool varies considerably across assignment groups. Currently, there are about 4,500 former Connecticut public school educators who left positions since 1992 for reasons other than retirement, half of whom are currently younger than age 50. They hold an average of three endorsements each. The largest number of endorsements are held in elementary education (4219), administration (1274) and special education (1214). The smallest number are held for library/media (156) and bilingual (162) positions.

New Flow into the Reserve Pool

Individuals who were certified during the year prior to September 1, 1998 who did not apply for or secure public school positions for the current year account for the most recent flow into the state's reserve pool. As of September 1, 1998, 1902 of the individuals who were certified during the previous year were not employed in professional positions in the state's public schools. The Department surveyed those individuals to determine their job search activities and their future plans. Nine hundred ten responded (48%). Appendix 5 contains a copy of the survey.

Of the individuals who responded to the survey, 63 percent applied for positions for the current year, 56 percent plan to apply for a public school position for fall 1999, and 70 percent hoped to have a public school position in five years. Their responses suggest that about 550 of the prospective educators will continue to be active members of the 'reserve pool, ' or about 16 percent of those individuals who were newly certified during the previous year. However, the depth of the new flow into the 'reserve pool' varies considerably across

assignment areas. A large number of the respondents who currently have applications filed for positions next year or who plan to file in the future hold degrees in elementary education and curriculum (180), history/social science (140) and English/humanities (70). The 'reserve pool' gained a modest number of applied educators (35), mathematics teachers (25), art and music teachers (25), special education and speech teachers (15), and health/P.E. (15). The 'reserve pool' for the following assignments gained only five or fewer additional educators: world languages (5), social worker (5), life and natural science (4), counselor (2), chemistry (2), bilingual education (1), and administrator (1).

The new 'reserve pool' members were quite selective in their search for positions, but not as selective as their counterparts who were hired. They submitted a median of eight applications each for positions. Approximately 10 percent applied to only one district and two-thirds applied to 10 or fewer districts.

These prospective educators also showed a preference for positions in suburban and small city districts over urban and rural districts. About 88 percent submitted applications to suburban districts, 79 percent to small cities, 63 percent to rural districts, and 59 percent to urban districts. The most influential factors in their decisions to apply for positions were the type of assignment, the distance of the district from their home, and salary/benefits.

Most of the individuals were employed at the time they were surveyed, with half in positions paying less than $20,000 per year. Nearly one-fourth reported earning an annual salary of at least $30,000, which would be at or above the typical beginning teacher salary in the state. One-fourth were employed as educators in Connecticut non-public schools or out-of-state, 37 percent were employed as substitutes or tutors, nearly 20 percent were employed outside of education, and 18 percent were not employed.

Supply Pool Concerns

The increasing proportion of newly certified individuals hired annually results in a smaller proportion of annual new flow into reserve pool. Some assignment areas have been consistently drawing from the reserve pool for the last three to five years because fewer individuals have been newly certified annually than were needed to fill new positions. For those assignment areas the 'reserve

pool' may not have sufficient depth to continue to offset the difference between the number of new educators needed annually and number who have been certified in previous years.

The current shortage of substitute teachers in the state, who are drawn from its educator reserve pool, is further evidence that pool may be quite shallow. Given the healthy economy and availability of jobs outside of education, individuals who in the past may have persisted longer in the reserve pool searching for public school employment, may now have a sufficient number of attractive options to draw them from the reserve pool. Prospective teachers with degrees in the sciences and technology-related disciplines are likely to have more employment options outside of public school teaching than their colleagues who are certified in many of the education-specific assignment areas.

Connecticut has set some of the highest certification standards nationally for entry into the public school teaching profession and continuation through and beyond the probationary period. A shortfall in the supply of new educators to meet future demand may force districts to employ staffing strategies to fill vacant positions which could reverse the quality advances that the state has achieved over the last decade. For example, generalists, who in the past received the now defunct K-8 certificate, are 'grandfathered' so they can fill middle school positions that now require specialized middle school language arts, mathematics, social studies, and science certification. If districts are unable to attract teachers with the appropriate discipline-specific middle school certification, they may be forced to moved K-8 generalists who currently teach at the elementary level into middle school positions and hire newly certified elementary certified educators, who are in high supply, to fill the vacated elementary positions. This provides a short term alternative to hiring teachers with emergency certificates or filling positions with long-term substitutes but, in the long run, it could counter the state's reform efforts to staff middle schools with teachers who have a strong academic background in the subjects they teach.

The Interface of Demand and Supply: Assignment Area Projections

The primary purpose of examining educator demand and supply is to determine whether there are likely to be shortages of educators to staff the state's public schools in the future, and, if there are, then to explore intervening strategies the state and

districts came employ to mediate the problem. Table 6 summarizes the components of demand and supply for 1999 to 2003 in the eighteen assignment areas. The ten assignment areas listed in the upper half of the table identify those areas where either state-wide or local shortages are currently expected: mathematics, reading, applied education, world languages, the arts, the physical sciences, speech and hearing, library/media specialists, health/physical education, and special education. The state does not expect that districts will have difficulty staffing the eight assignment groups listed at the bottom of the table.

The first numerical column identifies the projected average annual number of positions that will need to be filled from 1999 to 2003. The second and third columns juxtapose the projected average annual supply of newly certified educators and returning educators available to fill vacant positions, with the fourth column listing the total estimated supply drawn from the two sources and the fifth listing the estimated average annual number of positions that will be left unfilled (surplus of potential candidates state-wide in parentheses), assuming each individual in the total was willing to take a position anywhere in the state.

The remaining columns provide information about the potential of filling vacancies from other sources. The sixth and seventh columns rate the likelihood that reserve pool members and migrants from other disciplines could be drawn upon to fill projected unfilled positions. The eighth column provides a relative rating of the magnitude of the shortage, and the final column identifies assignment areas that districts had difficulty filling in the past.

The assignment groups for which Connecticut expects to have an inadequate supply of educators are consistent with those found in other states. We did find two inconsistencies between the current and projected supply of educators and districts' experience in filling positions. They are for special education teachers and administrators.

Even though the annual supply of teachers certified in special education exceeds the demand by a large margin, districts continued to have difficulty filling positions. This, we believe, is the case because many of the teachers who are certified in special education also hold additional endorsements in areas such as elementary or

Table 6: Projected Educator Supply and Demand by Assignment Area, 1999-2003

	Demand		*Supply*		Average				
Assignment Area	Avg. Ann. Expected Vacancies (1999-03)	Estimate of New Teachers*	Average Estimated Returning Educators	Estimated Total	Expected Number of Unfilled Positions	Availability of the Reserve Pool	Transfers from Other Endorsement	Expected Relative Shortage	Difficult to Fill
Shortage Areas									
Mathematics	258	132	41	173	85	low	high	1	
Reading	123	47	28	75	48	low	moderate	2	
Applied Education++	238	151	65	216	22	moderate	low	3	
World Languages**	188	120	38	158	30	low	moderate	4	
The Arts	245	180	56	236	9	moderate	low	5	X
Physical Sciences (Chemistry/Physics)	89	71	12	83	6	moderate	high	6	X (dual assign.)
Speech & Language	87	64	25	89	(2)	low	high	7	X
Library Media Specialist	52	41	15	56	(4)	low	moderate	8	X
Health/Physical Education	160	135	31	166	(6)	low	low	9	X (part time)
Special Education	415	445	141	586	(171)	low	low	10	
Non-Shortage Areas									
Elementary Education	1031	1714	218	1932	(901)	high	high		
English/Language Arts	292	226	50	276	16	high	high		
Bilingual and TESOL	73	84	20	104	(31)	low	moderate		X
History/Social Studies	233	233	38	271	(38)	high	high		
Life/Natural Sciences	153	139	29	168	(15)	moderate	high		X (dual assign.)
Other Teacher+	42	135	29	164	(122)	moderate	high		
Pupil Personnel Services	237	281	73	354	(117)	high	high		
Administrator	171	364	38	402	(231)	high	high		X (asst prin/prin)
Total	**4087**	**4562**	(endorsements)						
		3555	(individuals)						

* Includes newly endorsed educators and individuals who received endorsements through the Alternate Route Program. This represents total endorsements and overestimates supply. If people receive multiple endorsements, they are counted in each endorsement area. Recently, only one-half of those newly certified, get jobs the following year. (Annual averages based upon 1996-97 and 1997-98 endorsements.)

** Spanish, French and Latin account for a majority of the shortage in World Languages.

\+ Other Teacher includes: Computer Science, Driver Education, Other Secondary Teacher, School Nurse-Teacher and Teacher of Non-English Speaking Adults

English/language arts, allowing them to apply for or migrate to classroom positions in those areas which are often less stressful special education positions.

For fall 1998 and 1999, district reports from the annual School and Staffing Report and from a survey of personnel managers indicated that many districts had difficulty attracting well-qualified candidates for school-level administrative positions. Yet the supply data suggests that the pool of individuals who hold the required intermediate administrator certificate in Connecticut is very deep, with potential candidates currently working in other positions in the state's public schools. It appears that currently the incentives are not strong enough in Connecticut public schools to draw talented candidates to school-level and central office positions.

State Policy Interventions and District Hiring Practices to Mediate Educator Shortages

Connecticut has been interested in educator supply and demand for some time. Until recently, the state examined the issue at approximately five year intervals, with studies stopping after collecting and analyzing the data, and then concluding that the state did not have any wide-spread shortage. National press concerning prospective teacher shortages and local reports from many of the state's districts indicating that they were having difficulty filling administrative positions and spot shortages in other certification areas and in various geographic regions of the state in 1988 provided the impetus for the current study.

The study used the Connecticut State Department of Education's (CSDE) data bases for student enrollment, educator certification, and public school staffing, along with surveys of newly hired educators during the 1988-99 school year and recently certified individuals who were not employed in the states' public schools. The results of the demand and supply components of the study suggested that, although Connecticut should not expect to encounter a generalized shortage of educators over the course of the next five years, under the current conditions an increasing number of districts in the state would find difficulty filling positions with well-qualified candidates. The Department recognized that even a modest shortage of educators could create conditions which would reverse the progress the state had made during the last decade in increasing the quality of the state's public school work force. It recommended a series of strategies to off-set shortages of teachers, support staff, and administrators, which were included in its report to the Connecticut State Board of Education. The Board took a very active interest in this work and met on several occasions during May and June of 1999 to discuss the results. It approved the Department's recommendations and requested periodic up-dates on the implementation.

The Department's five recommendations are directed at both recruiting and retaining well-qualified educators for all of Connecticut's public schools. The five recommendations are outlined below, along with the implementation actions and

are extracted from the report, *Public School Educator Supply and Demand in Connecticut: A Look Toward the 21st Century* (CSDE, 1999).

1. **Create a multifaceted public relations and information campaign focusing on recruitment and retention of well-qualified educators.**

- Widely disseminate information on expected shortage and non-shortage assignment areas using a variety of media (web pages, bulletins, and advertisements.
- Provide information and encouragement for current elementary teachers to gain middle or high school certification in shortage areas.
- Work with the Connecticut Education Association and the American Federation of Teachers to promote Connecticut as a state with an excellent quality of life, attractive teacher salary scales, and successful and innovative educational programs.
- Target students early in their career decision process and preparation (middle school, high school, and community college), as well as in teacher preparation and other college programs.
- Draw upon recent retirees from education to fill vacancies in part-time and shortage areas by creating 'emeritus status'; and investigate lessening the financial restrictions for retired teachers who work.
- Support the regional education service center (RESC) initiatives that created a statewide web site listing all district vacancies and providing the ability for candidates to apply for jobs on line.
- Participate in regional and federal initiatives, such as Troops to Teachers and the Northeast Regional credential.

2. **Disseminate best practices in teacher recruitment, hiring practices, teacher support, and retention efforts.**

- Solicit information from districts on innovative and successful teacher recruitment and hiring practices and disseminate to all districts. Include information on LEA practices that focus on building human capacity through the initiation of professional activities such as encouraging collaboration with peers, encouraging participation in decision making and celebrating equity and excellence in teaching.

- Collect and disseminate information on successful aspirant programs for prospective administrators and propose new models to attract highly qualified educators.

3. **Expand the number and types of alternate-route-to-certification programs.**

- Include a year-round alternate-route program for shortage areas (e. g. school library/media specialist). Focus on attracting minorities and mid-career people to education careers.

4. **Consider inter district sharing of teachers for specialized positions.**

- Facilitate hiring teachers for part-time assignments in such areas as Advanced Placement courses, special education, middle grade world language, instrumental music and voice by combining part-time positions in near or adjacent districts to create full-time teaching assignments. Use the RESCs to coordinate regional information about the part-time needs of the districts they serve so part-time positions can be combined.

5. **Emphasize recruitment and retention of minority staff.**

- Publicize current loan forgiveness programs and grants for new teachers in shortage areas, focusing on minority applicants. Encourage and initiate new programs.
- Redesign the Teaching Opportunities for Paraprofessionals program to encourage minorities to pursue teaching careers.
- Create year-long, evening and weekend, alternate-route to certification programs with priority for minority applicants and to meet the needs of urban and priority districts.
- Provide small state grants for middle and high schools to operate future teachers clubs, and take additional initiatives, such as summer college experiences, to actively recruit public school students into the teaching profession.
- Encourage and staff regionally coordinated recruiting in New York, Boston, and nationwide at historically black colleges with large Spanish-speaking student populations.
- Convene Connecticut colleges and universities, through the Department of

Higher Education, to discuss on-campus activities to stimulate minority students' interest in teaching.

- Encourage PreK-12 public schools to provide opportunities for students to participate in 'teaching' experiences such as peer tutoring, cross school and grade tutoring, service learning, library reading programs, etc.
- Encourage two- and four-year colleges and universities and adult education to provide 'teaching' opportunities for students.

During the last year the Department has made considerable progress in implementing the recommendations. Table 7, on the following three pages summarizes the plan the Department put into place to operationalize the recommendations, the actions that would be implemented, the responsible organizations, and the targeted implementation date. Insuring that Connecticut continues to have a sufficient supply of well-qualified educators to meet the demand of its public school districts is a high priority and the implementation of strategies to do so is shared among the State Department of Education, its RESCs, the LEAs, and the higher education community in the state.

Appendix 6 contains a copy of a letter the commissioner sent to the superintendents of Connecticut's local school districts in February. The letter up-dates districts on the state's progress in implementing its intervention plan. The Department has been instrumental in providing information to a wide range of audiences about projected shortage areas, the opportunities in Connecticut for teaching careers, the state's certification requirements, and opportunities for current teachers to acquire additional endorsements to teach in new areas, and for mid-career professionals in other fields to acquire Connecticut public school certification. In addition, the state developed a variety of initiatives to draw talented minority candidates to the state's public schools and to encourage talented members of the current public school work force to pursue administrative positions.

Up-dated information about educator supply and demand, and the state's policy interventions is available on the state's web site: www.state.ct.us/sde.

Table 7: Intervention Plan to Offset Educator Shortages in Connecticut

RECOMMENDATION	ACTION	WHO	WHEN
1. Create a multifaceted public relations and information campaign focusing on recruitment and retention of well-qualified educators.			
• Widely disseminate information on expected shortage and non-shortage assignment areas using a variety of distribution media (web pages, bulletins, and advertisements).	• Technical Report, print and web • Research Bulletin, print and web • Brochure • Certification Web Site	SDE SDE SDE	8/99 8/99 8/99
• Provide information and encouragement for current elementary teachers to gain middle or high school certification in shortage areas.	Send letter to currently certified teachers with information on adding endorsements.	SDE	Spring 2000
• Work with the Connecticut Education Association and the American Federation of Teachers to promote Connecticut as a state with an excellent quality of life, attractive teacher salary scales, and successful and innovative educational programs.	Contact CEA and AFT to work together.	SDE	Ongoing
• Target students early in their career decision process and preparation (middle school, high school and community college), as well as those in teacher preparation and other college programs.	Distribute brochures and information Encourage YES clubs Goals 2000 Funding	SDE with RESCs, IHE (Institutions of Higher Ed)	Ongoing
• Draw upon recent retirees from education to fill vacancies in part-time and shortage areas by creating 'emeritus status'; and investigate lessening the financial restrictions for retired teachers for work.	Explore and propose statutory changes to Teachers' Retirement Board legislation.	SDE	1999-2000 legislative session
• Support the RESC initiative that created a statewide website listing all district vacancies and providing the ability for candidates to apply for jobs on-line.	Provide developmental funds to RESCs.	SDE	Completed
• Participate in regional and federal initiatives, such as Troops to Teachers and the Northeast Regional Credential (NRC).	Join and participate in Troops to Teachers. (Already participate in NRC.)	SDE	When available

RECOMMENDATION	ACTION	WHO	WHEN
2. Disseminate best practices in teacher recruitment, hiring practices, teacher support and retention efforts.			
• Solicit information from districts on innovative and successful teacher recruitment and hiring and retention practices, and disseminate to all districts. Include information on LEA practices that focus on building human capacity through the initiation of professional activities such as encouraging collaboration with peers, encouraging participation in decision making and celebrating equity and excellence in teaching.	Collect and disseminate best practices on SDE web site.	SDE	Ongoing
• Collect and disseminate information on successful aspirant programs for prospective administrators and propose new models to attract highly qualified educators.	Fund model programs with Goals 2000 grants.	SDE	Fall 1999
3. Expand the number and types of alternate-route-to-certification programs.			
• Include a year-round alternate-route program for shortage areas, (e.g., school library media specialist advanced alternative preparation will be operational in Fall 1999.) Focus on attracting minorities and mid-career people to education careers.	Research federal funding to create alternate route program and expand minority participation.	SDE	September 1999
4. **Consider interdistrict sharing of teachers for specialized positions**.			
• Facilitate hiring teachers for part-time assignments in such areas as Advanced Placement courses, special education, middle grade world language, instrumental music and voice by combining part-time positions in near or adjacent districts to create full-time teaching assignments. Use the RESCs to coordinate regional information about the part-time needs of the districts they serve so part-time positions can be combined.	Publicize part-time positions, work with districts to coordinate hiring.	RESCs	

RECOMMENDATION	ACTION	WHO	WHEN
5. Emphasize recruitment and retention of minority staff.			
• Publicize current loan forgiveness programs or grants for new teachers in shortage areas, focusing on minority applicants. Encourage and initiate new programs.	Consider legislation for loan forgiveness in shortage areas.	Higher Education	Ongoing
• Redesign the Teaching Opportunities for Paraprofessionals program to encourage minorities to pursue teaching careers.	Propose legislation.	SDE	1999-2000 legislative session
• Create year-long, evenings and weekends, alternate route to certification programs with priority for minority applicants and to meet the needs of urban and priority school districts.	Research federal funding.		September 1999, Open Fall 2000
• Provide small state grants for middle and high schools to operate future teacher clubs, and take additional initiatives, such as summer college experiences, to actively recruit public school students into the teaching profession.	Provide grants for clubs and programs with Goals 2000 funding.	SDE	September 1999
• Encourage and staff regionally coordinated recruiting in New York, Boston and nationwide at historically black colleges and colleges with large Spanish-speaking student populations.	Disseminate information to districts on recruitment fairs. Encourage and support local districts' recruitment fairs. Participate in national efforts to recruit minorities.	SDE/Higher Education	Spring 2000
• Convene Connecticut colleges and universities, through the Department of Higher Education, to discuss on-campus activities to stimulate interest of minority students in teaching.	Meet with higher education to plan strategy.	SDE/Higher Education	Spring 2000
• Encourage preK-12 public schools to provide opportunities for students to participate in 'teaching' experiences such as peer tutoring, cross school and grade tutoring, service learning, library reading program, etc.	Encourage and fund YES clubs, service learning, cooperative work experience (in schools), school-to-career programs and other initiatives.	SDE	Ongoing
• Encourage two- and four-year colleges and universities and adult education to provide 'teaching' opportunities to students.	Establish partnership agreement with higher education.	SDE/ Higher Education	

Notes

[1] The 18 endorsement groups in this study drew educators from the certification area designated in parentheses:

Elementary (K, Pre-K, Birth to K, Nursery to K, K-8, K-6, K-3, 1-8, 1-6)
Reading (Reading Consultant, Reading & Language Arts Consultant, Remedial Reading/Language Arts)
Special Education (Deaf, Blind, Partially Sighted, Special Education, Comprehensive Special Education)
Speech and Language Pathology (Speech and Language Pathology)
Bilingual/TESOL (Bilingual, TESOL)
English (English, 7 - 12 and English, middle grades)
World Languages (French, German, Italian, Latin, Russian, Spanish, Other language, Foreign Language, elementary)
Mathematics (Mathematics, 7 - 12 and Mathematics, middle grades)
Physical Sciences (Chemistry, 7-12 and Physics, 7-12)
Life/Natural Sciences (Biology, 7 - 12 and Biology, middle grades, Earth Science, 7 - 12 and Earth Science, middle grades, General Science, 7 - 12 and General Science, middle grades)
History/Social Studies (History, History and Social Studies, 7 - 12 and History and Social Studies, middle grades)
The Arts (Art, PreK - 12 and Music, PreK - 12)
Health/Physical Education (Health, Physical Education, PreK - 12)
Applied Education (Business Education, Vocational Agriculture, Home Economics, Vocational Homemaking, Technology Education, Marketing Education, Occupational Subjects, Trades Related Subjects, Trade and Industrial Education)
Other Teacher (Computer Science, Driver Education, Other Secondary Teacher, School Nurse-Teacher, Teacher of Non-English Speaking Adults)
Pupil Support Services (School Counselor, School Psychologist, School Social Worker)
Library/Media Specialist (Library/Media Specialist, PreK - 12)
Administrator (Intermediate Administrator and Supervisor, School Business Administrator, Vocational School Administrator, School Superintendent, Director of Adult Education, Department Chair)

[2] Data for this report were drawn from the following sources:
- 1997 and 1998 Connecticut State Department of Education Staff Files
- Connecticut State Department of Education Certification Files
- Connecticut Department of Higher Education 'College Enrollment in Connecticut Through the 1990s' and 'Degrees Conferred by Connecticut Institutions of Higher Education'
- 1997 and 1998 Connecticut State Department of Education 'Fall Hiring Reports'
- Surveys:
  - Newly Hired Educators - Fall 1998
  - Non-Teaching New Certificates - Fall 1998
  - District Personnel Directors Survey on Recruitment and Hiring

[3] This factor adjusts the estimated N (number of new hires) which is a 'body count' based on the part-time proportion of educators in the continuing educator pool, by first converting it to the FTE equivalent of educators (assuming that the average part-time teacher works .5 time), and then multiplying by '1 plus the three-year average of proportion of part-time positions newly hired educators filled.' For example, about 5% of all continuing educators and 15% of all newly hired educators are part-time. The adjustment factor would be calculated: (N(1 - .5*.05)*1.15) = N*1.12125. This provides the nu7mber of full and part-time educators that the state's districts will need to hire.

[4] The district responsiveness rate,R, is an adjustment accounting for student enrollment projected to the state, not individual district, level. As a result, a change in the equivalent of one class of students at the state level does not translate in the addition or elimination of exactly one teacher.

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Appendix 1: Projected Total Demand by Assignment Group

Assignment Area	Actual 1998	Year 1999	2000	2001	2002	2003
Elementary	13,301	13,486	13,563	13,613	13,620	13,621
Reading	1,154	1,209	1,255	1,257	1,256	1,256
Special Education	5,078	5,174	5,213	5,245	5,258	5,267
Speech & Language	882	914	915	915	912	910
Bilingual/TESOL	833	843	845	847	847	847
English	2,802	2,892	2,952	3,001	3,029	3,053
World Language	1,467	1,546	1,575	1,601	1,617	1,631
Mathematics	2,375	2,443	2,498	2,545	2,573	2,588
Physical Science	795	820	837	851	862	872
Life/Natural Science	1,482	1,537	1,570	1,596	1,612	1,625
History/Social Studies	2,206	2,266	2,314	2,353	2,375	2,395
The Arts	2,692	2,755	2,768	2,776	2,779	2,779
Health, Physical Ed.	1,960	1,992	2,006	2,016	2,021	2,024
Applied Education	2,579	2,649	2,674	2,691	2,700	2,708
Other Teacher	1,008	1,027	1,030	1,033	1,034	1,034
Pupil Support	2,588	2,639	2,658	2,673	2,681	2,687
Library/Media	733	761	761	762	762	762
Administration	2,631	2,674	2,677	2,680	2,681	2,682
Total	46,566	47,627	48,111	48,455	48,619	48,741

Appendix 2: Projected New Annual Demand for Full and Part-time Educators by Assignment Group

Assignment Area	Year 1998 Actual *	1999 **	2000	2001	2002	2003	Average 1999-03
Elementary	1,138	1,077	1,015	1,024	1,010	1,030	1,031
Reading	66	149	152	104	110	117	123
Special Education	468	464	414	409	388	400	415
Speech & Language	77	101	89	82	78	87	87
Bilingual/TESOL	78	73	69	77	67	77	73
English	287	311	299	292	277	281	292
World Language	153	232	185	178	172	174	188
Mathematics	187	268	255	260	252	253	258
Physical Science	62	88	87	89	88	92	89
Life/Natural Science	152	166	156	151	147	143	153
History/Social Studies	188	237	235	234	226	231	233
The Arts	213	285	246	232	231	230	245
Health, Physical Ed.	140	175	154	158	154	161	160
Applied Education	170	274	238	217	224	235	238
Other Teacher	65	51	42	36	41	40	42
Pupil Support	233	256	235	231	231	231	237
Library/Media	48	72	52	44	42	48	52
Administration	166	184	156	164	175	177	171
Total	**3,891**	**4,463**	**4,079**	**3,982**	**3,913**	**4,007**	**4,087**

* 1998 numbers include only new educators hired to fill positions.

** 1999 numbers reflect estimates of the number of positions that need to be filled (by both new hires and transfers from other areas) and include those positions left unfilled in 1998.

Appendix 3: Newly Hired Educator Survey

Survey - New and Returning Connecticut Public School Educators

INSTRUCTIONS:

1. Complete the survey responses.
2. Refold the survey, prestamped face on the outside and tape.
3. Mail back today!

This information will kept in the strictest confidence.

1. Name (**Last**, First, Middle Initial):_____

2. Social Security Number: _____-____-_____

3. Were you employed as a certified Connecticut public school teacher, administrator, or specialist (not permanent substitute) at the beginning of the last school year (**September 1996**)?
   ____ No ____ Yes (District: _____ Date began: _____)

4. Circle the ONE (1) category that best describes your type of employment status in September 1996:
   a. Connecticut parochial school teacher, specialist, or administrator
   b. Connecticut independent school teacher, specialist, or administrator
   c. Educator in a Connecticut non-public preschool or post-secondary institution
   d. Public or private school teacher, specialist, or administrator in another state (State: _____)
   e. Substitute or permanent substitute
   f. Teacher aide or tutor
   g. Full-time student / student teacher
   h. Part-time student/ part-time employee
   i. Maternity/ child rearing or other unpaid leave of absence
   j. Homemaker
   k. Employed outside of education
   l. Seeking employment
   m. Other: _____

5. At any time prior to this school year, were you employed as a paid full-time teacher, administrator, or specialist outside of Connecticut public schools?
   ____ a. Yes (Go to **#6**) ____ b. No (Go to **#8**)

6. What is the number of years of full-time paid teaching, administrative, or specialist experience you have had in each of the types of schools listed below. Enter "00" if you have no previous experience.
   ____ a. Connecticut parochial or independent schools ____ b. Out-of-state public / private schools
   ____ c. Non-public preschool or daycare ____ d. Post-secondary institutions

7. During which school year did you last work as a full-time teacher, administrator, or specialist?
   19___-___ In which state? _____

8. a. At what college did you complete your bachelor's degree? _____
   b. In which state is the college located? _____ Year awarded? 19____

9. Circle each degree you hold and identify your area(s) or specialization:
   a. Bachelor's degree (major: _____ minor: _____)
   b. Master's degree (specialty: _____)
   c. Sixth Year or Second Master's (specialty: _____)
   d. Doctorate (specialty: _____)
   e. Other advanced degree (degree: _____ specialty: _____)

10. Circle the letter of the category that identifies your undergraduate grade point average (G.P.A.) based on a scale of A=4.0, B=3.0, C=2.0, etc.:
    a. 2.00-2.49 b. 2.50-2.99 c. 3.0-3.49 d. 3.50 - 4.00

11. Circle the category that best describes the total number of undergraduate or graduate college-level courses you successfully completed in:

a. mathematics	0	1	2-3	4-5	more than 5
b. natural and physical sciences	0	1	2-3	4-5	more than 5
c. the arts	0	1	2-3	4-5	more than 5
d. English: literature and composition	0	1	2-3	4-5	more than 5
e. the social sciences	0	1	2-3	4-5	more than 5
f. foreign languages	0	1	2-3	4-5	more than 5
g. computers/computer technology	0	1	2-3	4-5	more than 5

12. Circle the ONE category that best describes how you learned about the availability of your current job:
    a. The job was assigned after my return from a leave of absence
    b. The job was assigned after my return from a layoff
    c. By substituting in the district
    d. By student-teaching in the district
    e. From a friend or colleague
    f. From a newspaper ad or professional placement agency
    g. From a college placement bulletin or meeting with a district recruiter
    h. By contacting the district directly
    i. Other: _____

13. To how many school districts did you apply this year? _____

14. Did you apply to any districts that are:

a. large cities: (e.g. Hartford, Waterbury, Bridgeport)	Yes	No
b. small cities: (e.g. Middletown, New London, Danbury)	Yes	No
c. suburban: (e.g. Branford, Avon, Darien)	Yes	No
d. rural: (e.g. Kent, Woodstock, Stafford)	Yes	No

15. For how many years of the last five years have you applied for CT public school positions? _____

16. Identify the ONE MOST influential factor in your decision to enter the field of education rather than selecting a career in another field: _____
    _____

17. Identify the ONE MOST influential factor in your decision to accept your current position rather than a position in another district or school: _____
    _____

18. As of February 1, on how many occasions has your performance been formally observed by:
    ____ a. school administrators ____ b. chair/ other supervisors
    ____ c. colleagues ____ d. BEST assessors
    ____ e. BEST mentor

19. As of February 1, on how many occasions have you had opportunities to formally observe the classroom performance of colleagues working in positions similar to yours? ____

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20. During a typical school week, how many hours do you spend working collaboratively on instructional issues with colleagues? ____

21. During a typical month this school year, how many hours did you spend working with your BEST mentor? ____

22. a. What ONE factor contributes most to your success in your current position?
_____
_____

b. What do you believe is the MOST important factor that contributes to new teachers' success during their first year in a new position? _____
_____
_____

23. a. What was the GREATEST challenge you encountered in your position this year?
_____
_____

b. What do you believe is the GREATEST challenge that new teachers in general encounter during their first year in new positions? _____
_____

24. What, do you believe, has been your major accomplishment during this school year? _____
_____

25. a. Which of the following categories best describes your level of proficiency in using computers?
none low average high

b. How did you acquire your skills and knowledge about computers and instructional computer applications? (Check all that apply.)
____ undergraduate courses
____ graduate courses
____ in-service workshops
____ professional meetings and conferences
____ self-study
____ other: _____

c. Rate your proficiency in using the following computer applications:

word processing	none	low	average	high
spreadsheets	none	low	average	high
data bases	none	low	average	high
instructional programs	none	low	average	high

d. How is technology used for instructional purposes in your classroom? _____
_____

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Appendix 4: Endorsements of Individuals Awarded First Certificates

Assignment Area	Year 1990-91	1991-92	1992-93	1993-94	1994-95	1995-96	1996-97	1997-98
Elementary	1,336	1,315	1,504	1,397	1,522	1,470	1,612	1,815
Reading	127	141	220	148	74	70	53	40
Special Education	314	310	386	434	421	422	439	450
Speech & Language	45	48	53	38	59	59	49	79
Bilingual/TESOL	124	82	226	197	123	99	66	101
English	226	177	206	251	256	225	203	248
World Language	95	96	97	96	98	99	105	135
Mathematics	158	185	146	130	136	145	140	123
Physical Science	57	66	86	40	75	55	66	76
Life/Natural Science	101	92	130	89	105	97	125	152
History/Social Studies	237	247	239	266	232	233	222	244
The Arts	194	174	154	160	164	158	171	189
Health, Physical Ed.	132	142	114	115	109	87	126	143
Applied Education	225	387	137	125	110	118	171	130
Other Teacher	357	296	251	319	211	138	156	113
Pupil Support	199	198	195	221	226	279	283	278
Library/Media	49	31	28	54	50	37	38	44
Administration	535	476	228	325	328	345	267	460
Total Endorsements	**4,511**	**4,463**	**4,400**	**4,405**	**4,299**	**4,136**	**4,292**	**4,820**
Total Individuals	2,967	3,040	2,934	2,877	3,176	3,140	3,364	3,745
Percentage of those first endorsed who were hired	17.5	19.2	23.8	34.0	37.9	44.8	46.2	54.3

* This count includes individuals who have been awarded their first endorsement in the assignment area plus previously endorsed individuals in other assignment areas who have been awarded an additional endorsement in a new assignment area.

Appendix 5: Non-teaching New Certificant

Survey - Newly Certified Connecticut Educators

INSTRUCTIONS:

1. **Complete the survey responses.**
2. **Refold the survey, prestamped face on the outside, and mail back today!**

This information will kept in the strictest confidence.

Section A: Background Information and Undergraduate Education:

1. Name (Last, First, Middle Initial):_____
2. Social Security Number: _____-____-_____
3. Are you currently employed as a certified Connecticut public school educator (not permanent substitute)
   ____ Yes (District:_____ Date began:_____)
   STOP! Please return this form, you need not fill out the remaining items.
   _____ No. Please complete the remaining items.
4. Marital status: (0=unmarried, 1=married) _____
5. Race (White, Black, Hispanic, Asian/Pacific Islander, Native American) _____
6. a. Number of children: (If none, skip b) _____
   b. Age of youngest child: _____
7. Zip code of your current home address: _____
8. a. At what college (state) did you earn your bachelor's degree?_____
   b. In what year did you graduate? 19____
   c. List your major(s): _____ d. List your minor(s):_____
   e. Circle the letter of the category that identifies your undergraduate grade point average (G.P.A.) based on a scale of A=4.0, B=3.0, C=2.0: 2.00-2.49 2.50-2.99 3.00-3.49 3.50-4.00
   f. Have you completed your Master's degree? Yes (year completed: 19____) No

Section B: Current Employment Status:

1. Circle the letter of ONE category that best describes current employment status:
   a. a Connecticut parochial school teacher
   b. a Connecticut private school teacher
   c. an out-of-state teacher
   d. a preschool/ day-care teacher or post-secondary educator
   e. a substitute/teacher aide/ tutor
   f. a full-time student
   g. a homemaker
   h. seeking employment as a teacher
   i. seeking employment outside of education
   j. employed outside of education(specify:_____)
   (If you selected "j", complete Sections B-2 through B-4, otherwise go to Section C)
2. Circle the letter of the ONE category that **best** describes your current job:
   a. executive/managerial
   b. technical
   c. sales/marketing
   d. professional specialty (Identify: _____)
   e. administrative support/clerical

3. Circle your current employment status: part-time full-time

4. Circle the letter of the income category which **best** describes your 1997 pretax income earned from the occupation listed above:
   a. less than $20,000 b. $20,000 to $29,999 c. $30,000 to $39,999
   d. $40,000 to $49,999 e. $50,000 or over

Section C: Application for Public School Teaching Positions

1. Did you apply for Connecticut public school professional positions for the 1997-98 school year ?
   Yes No *(If you answered 'Yes', complete C-2 through C-6, otherwise go to Question C-7)*

2. To how many school districts did you apply? _____

3. Did you apply to any districts that are:
   a. large cities: (e.g. Hartford, Waterbury, Bridgeport) Yes No
   b. small cities: (e.g. Middletown, New London, Danbury) Yes No
   c. suburban: (e.g. Branford, Avon, Darien) Yes No
   d. rural: (Kent, Woodstock, Stafford) Yes No

4. Were you offered any public school teaching positions? Yes No *(If "No," go to Section D)*

5. Did you reject any offers? Yes No *(If "No," go to Section D)*

6. Why did you refuse the offer(s)?_____
   (Go to Section D)

7. If you did not look for a teaching position, why didn't you?_____
   _____

Section D: Future Employment Plans

1. Do you have any applications presently on file for Connecticut public school teaching positions?
   Yes No

2. Use the scale 0 = not at all, 1 = not too likely, 2 = fairly likely, 3 = very likely, 4 = definitely, to answer the following questions:
   a. How likely is it that you will apply for a teaching position for the next school year? _____
   b. How likely is it that you will apply for a teaching position during the next five years? _____

3. Please rate each of the following as it affects your decision in applying for a teaching position using the scale 0= not important, 1= somewhat important; 2= very important:
   a. distance you are willing to drive _____
   b. salary/benefits _____
   c. type of community _____
   d. reputation of the community _____
   e. school level _____
   f. type of teaching assignment _____
   g. school organization _____
   h. employment options outside of education _____
   i. Connecticut licensure process (testing and BEST requirements) _____

4. What factors, other than those listed in D-4 , influence your decision when applying for teaching positions? _____

Appendix 6: Commissioner's February 2000 Up-date Letter to LEAs

Series 1999-2000
Circular Letter: C-12

TO: Superintendents of Schools

FROM: Theodore S. Sergi, Commissioner of Education

DATE: February 25, 2000

SUBJECT: Public School Educator Supply and Demand in Connecticut, Update on Recommendations

In May and June 1999, the State Board of Education discussed the report, *Public School Educator Supply and Demand in Connecticut: A Look Toward the 21st Century*. The report concludes with a series of recommendations to alleviate potential shortages of educators, which requires that we all work together. This letter highlights some of the actions we are taking as a result of the recommendations and includes the partners working together to insure there are adequate numbers of qualified educators in Connecticut.

State Department of Education

- Provide information on expected shortage and non-shortage areas.
  - Our report, *Public School Educator Supply and Demand in Connecticut: A Look Toward the 21st Century*, will soon be available on our web-site. We are also soliciting information on exemplary recruitment, hiring and retention practices from school districts for placement on our web-site.

- Provide information on careers in education.
  - A brochure promoting teaching in Connecticut and identifying shortage areas has been distributed to school counselors, applicants for certification, and higher education institutions.

- Provide information on how to become an educator.
  - For current elementary teachers, and for those certified in elementary education but not currently teaching, we will provide information on how to gain middle or high school certification. In Connecticut, elementary education is not a shortage area; we have many more people certified each year than job openings and many people certified, but not teaching, in the "reserve pool". Soon, we are going to contact those recently certified but not teaching with information on expected shortages and on how to add middle or high school endorsements, expecting that some may still be interested in a teaching career. We will next contact elementary teachers, and give them the same information. Some may wish to move to higher grades.

- Encourage retired educators to return to the classroom.
  - We have introduced a legislative proposal that would allow retired teachers to return to teaching without the present financial restriction.

- Expand minority recruitment efforts.
  - We have met with deans in Connecticut colleges and universities to discuss on-campus activities to stimulate the interest of minority students in teaching.
  - We will also continue to participate in national efforts to recruit minorities to teaching and disseminate information on recruitment fairs to all our districts.
  - We have hired Dr. Yuhang Rong under a federal grant to spearhead statewide efforts to attract and retain a qualified, diverse teaching force. He can be reached at: **Yuhang.Rong@po.state.ct.us**.

- Encourage people to pursue careers in administration.
  - We have used some Goals 2000 funding to local districts, regional educational service centers and higher education to develop models to attract highly qualified educators to administration. These models will then be disseminated statewide.
  - We will be establishing a commission to study school leadership in Connecticut that will make a series of recommendations about recruiting and retaining high caliber school leaders.

- Expand alternate route to certification program.
  - We have just established an alternative route program for teachers to add an endorsement in school library media offered through ACES.

Local Education Agencies

- Encourage students to pursue careers in education.
  - We are encouraging service learning, cooperative work experience in schools and school-to-career programs.
  - We also encourage public schools, Pre-K through college, to provide opportunities for students to participate in teaching experiences, such as peer tutoring, cross school and grade tutoring, service learning, and library reading programs.
  - Distribute brochure on teaching as a career to interested students.
  - Create or expand future teacher clubs in middle and high schools.

- Expand minority recruitment efforts.
  - Participate in state, regional and national minority recruitment efforts.

Regional Educational Service Centers

- Provide information on existing openings and provide on-line application.
  - The Regional Educational Service Centers (RESCs) have created a statewide website (CTREAP) listing district vacancies and providing the ability for candidates to apply for jobs on-line using a standardized application. Districts can post positions and applicants can apply for multiple positions by completing only one application. The state website has a direct link to CTREAP. Information on CTREAP registration is distributed to all graduates of CT teacher preparation programs.

- Encourage students to pursue careers in education.
  - We have received a three-year federal grant to promote teacher recruitment. A portion of the grant initiative includes working with RESCs to promote future teachers' clubs and to coordinate the many district-level initiatives.
  - We are encouraging service learning, cooperative work experience in schools and school-to-career programs.
  - We also encourage public schools, Pre-K through college, to provide opportunities for students to participate in teaching experiences, such as peer tutoring, cross school and grade tutoring, service learning, and library reading programs.

- Provide assistance in filling part-time positions.
  - We have recommended that our regional educational service centers take a leadership role in working with their member districts to fill part-time positions by combining part-time assignments in like subjects in near or adjacent districts to create full-time opportunities.

- Expand alternate route to certification program.
  - RESC directors are discussing offering alternate route to certification programs for cross endorsements in shortage areas such as mathematics and science.

Higher Education

- Expand alternate route to certification program.
  - The Department of Higher Education is working to revamp the current Alternate Route to Certification (ARC) program and to add a year-round weekend model focused on bilingual education and other shortage area subjects, such as mathematics, science and world languages.

- Provide flexible scheduling for instruction.
  - Higher education has begun to make more extensive use of technology to offer more courses on-line, at night and on weekends. Central Connecticut State University is exploring offering courses for cross endorsement in mathematics.
  - Information on current loan forgiveness programs and grants for teachers in shortage areas is available on the higher education website: **ctdhe.commnet.edu**

- Encourage students to pursue careers in education.
  - We are encouraging service learning, cooperative work experience in schools and school-to-career programs.
  - We also encourage public schools, Pre-K through college, to provide opportunities for students to participate in teaching experiences, such as peer tutoring, cross school and grade tutoring, service learning, and library reading programs.

We are encouraged that we are on the right track, but know we have far to go to make sure that districts have enough highly qualified educators to meet their needs. In order to ensure we have sufficient numbers of qualified educators in our schools, we need to use multiple strategies and work together with many partners. We will continue to monitor supply and demand through our fall hiring report and certification databases, and continue our work in implementing the recommendations of this study. If you would like additional copies of our report, feel free to contact Judith Thompson, Bureau of Program and Teacher Evaluation, at (860) 566-4316, or by e-mail at: judith.thompson@po.state.ct.us.

Thank you.

TSS:jta